the eyeballs correctly in any desired position the exercise of peripheral apparatus of muscular sense is required, the only possible channels under the above conditions would seem to be deep branches of the Vth nerve or the IIIrd, IVth, and VIth so-called "motor" nerves themselves. As previously stated, the former are by both my earlier and later degeneration experiments excluded. The latter, therefore, are the only ones remaining, for the superficial branches of the Vth and the retinæ are put out of action by the conditions of experiment.

I am indebted to Mr. E. E. Laslett for carrying out the observations with me. Details regarding the methods employed and the results obtained will be given in a completer paper written in conjunction with him.

"An Experiment in Search of a Directive Action of one Quartz Crystal on another." By J. H. POYNTING, Sc.D., F.R.S., and P. L GRAY, B.Sc. Received September 27,—Read November 17, 1898.

(Abstract.)

A quartz sphere, 0·9 cm. diameter, weight 1·004 grams, was suspended by a long quartz fibre so that its time of vibration was about 120 seconds. A second quartz sphere, 6·6 cm. diameter, weighing 399·9 grams, with its centre on a level with that of the first and 5·9 cm. from it, was rotated continuously in a period of 115 seconds in one series, and in a period of 230 seconds in another series of observations.

The axis of the smaller sphere was horizontal and perpendicular to the line through the centres. Any directive action should manifest itself as a periodic couple, producing forced oscillations in the smaller sphere.

If the ends of the axis of a quartz crystal are indistinguishable the couple should go through its values in half a revolution of the larger sphere. This is termed the "quadrantal" couple, and to test for it the time of revolution was 230 seconds, or nearly double that of the suspended sphere. If the ends of the axis are poles, like those of a magnet, the couple should go through its values only in a complete revolution. This is termed the "semi-circular" couple, and to test for it the time of revolution was 115 seconds, or nearly equal to that of the suspended sphere. The position of this latter sphere was read by means of mirror and scale every 11·5 seconds, *i.e.*, at ten equidistant phases of the 115-seconds period. By taking a large number of periods, the mean reading for each phase should be freed to a great extent from other periodic motions and accidental disturbances, and a 115-second vibration should, if it existed, be rendered evident.

The quadrantal and semi-circular series of observations both gave evidence of periodic vibrations of 115 seconds, but so small that they could only be put down as giving superior limits, and not at all as proving the existence of the couples.

Assuming that the gravitation constant in the quadrantal case is G for parallel and G′ for crossed axes, the existence of a couple enables us to find $(G - G')/G$, and the observations show that this fraction is not greater than 1/16500.

Assuming that the gravitation constant in the semi-circular case is G for like parallel axes, and G′ for unlike parallel axes, $(G - G')/G$ is not greater than 1/2850. The semi-circular vibration outstanding after the elimination of disturbances was much greater than the quadrantal, no doubt owing to the fact that want of axial symmetry would itself lead to a semi-circular couple; and though an attempt was made to eliminate the effect, it was probably unsuccessful.

"Contributions to our Knowledge of the Formation, Storage, and Depletion of Carbohydrates in Monocotyledons." By JOHN PARKIN, M.A., Trin. Coll., Camb. Communicated by Professor MARSHALL WARD. Received July 16,—Read November 17, 1898.

(Abstract.)

The paper is divided into two parts, the first dealing with the formation of starch by assimilation in the leaves, the second with the occurrence of starch and inulins in the reserve-organs of various Monocotyledons.

The author has investigated about seventy species, belonging to all the principal groups of Monocotyledons, some of them at various different stages of growth, and finds that starch due to normal assimilation in the leaves occurs in very different amounts in different genera. Relatively few produce much, and some form none at all, but species from most of the principal families form some starch in their mesophyll.

On comparing the type of leaf, its position and age, the habit of the plant, and the period of normal activity, the author is led to suggest that some connection exists with the storage or non-storage of temporary starch. Broad and cauline leaves, those of aquatic Monocotyledons, and those working at higher temperatures in the summer, seem more prone to have starch than narrow radical leaves, those of forms in dry situations, and those of spring species. That the age of the leaf affects the question is shown by the results with *Allium*, a genus long known not to form starch under ordinary conditions: the